M/023/012

EarthFax

EarthFax
Engineering, Inc.
Engineers/Scientists
7324 So. Union Park Ave.
Suite100
Midvale, Utah 84047
Telephone 801-561-1555
Fax 801-561-1861
www.earthfax.com

June 13, 2005

Tom Munson
Utah Division of Oil, Gas and Mining
1594 West North Temple
Salt Lake City, UT 84116

Subject: Clean Copy Submittal of Revised
Nielson Sandstone Mine Notice of Intent
Ash Grove Cement Company

Dear Tom:

Thank you for your recent review of modifications to the Ash Grove Cement Company Nielson Sandstone Mine Notice of Intent. As a result of that review, I am pleased to enclose two clean copies (without redline or strikeout) of the following material:

Item	Revised	New
Section 106 (text and tables)	●	
Figure 106-5		●
Appendix 106-3		●
Appendix 106-4		●
Section 107 (text)	●	
Section 109 (text)	●	
Section 110 (text)	●	
Appendix 110-1		●
Appendix 110-2		●
Section 113 (text)	●	
Appendix 113-1		●

Several of the enclosed pages had no text changes, but are being submitted due to pagination changes and for ease of insertion.

Thank you again for your assistance. Please contact Josh Nelson of Ash Grove or myself if you have any questions.

Sincerely,

Rich

Richard B. White, P.E.
President

Enclosure

cc: (Josh Nelson, Ash Grove)

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JUN 30 2005
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JUN 14 2005
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M/023/012

SECTION 106 - OPERATION PLAN

106.1 MINERAL TO BE MINED

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The material to be mined at the Nielson Sandstone Mine is silica.

106.2 OPERATION TYPE

The Nielson Sandstone Mine began operation in 1987. Since opening, the mine has operated as a conventional open pit mine. Typically, the mine was operated as a single bench pit where the mineral was excavated on one level. This was done by drilling and blasting the mineral, which was then excavated and placed in piles for temporary storage.

The expansion of the existing pit will be conducted also using a single bench approach. As a new area of the pit is to be disturbed, soils in the area will be stripped. Then, the total bench height for the area will be completely mined by drilling and blasting the rock and removing the mineral. When the limits of the pit are reached, as shown on Map 106-1, the pit will be graded and reclamation will commence.

Pit 2 will be mined as a repeated single bench operation starting at the top of the ridge. For each level of the mine, a flat floor will be constructed until the floor reaches an elevation of 5320 feet (see Map 106-2). For the final level, the floor on the western portion of the pit will be warped up to allow the pit to match the adjacent topography. On all other levels, the pit will be mined to daylight on all but the northwest edge. On this portion of the pit, a 2H: 1V pit slope will be constructed to blend to the existing topography of the ridge. It is envisioned that mining of a single level will be completed before the next level would be developed. However, development of mining of Pit 2 will ultimately be determined based on mineral quality, plant production requirements, and economics of mining and plant operation.

Due to the remote location of the mine and plant area, access is a concern. Weather conditions have previously restricted access to the area for haulage access. Because the Nielson mine site has an all-weather road, to prevent supply problems to the plant, temporary storage of shale, slag, and iron ore is provided at the site. It is anticipated that the volume of materials stored at the site will be approximately 30,000 tons of steel-mill scale, up to 450,000 tons of slag, and 2,000 tons of shale (see Figure 106-5). The steel-mill scale and shale will normally be used within 1 year of being hauled to the mine site. The slag will be hauled to the site over a 1 to 2 year period and should be used within 5 to 7 years of being placed at the site. The stored silica, shale, slag, and iron ore are hauled by truck to Ash Grove's Leamington cement plant about 4 miles west for processing on an as-needed basis.

The chemical forms of the temporarily stored materials are presented in Table 106-1. As can be seen, the chemistry of the materials is not conducive to potential acid mine drainage conditions.

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In fact, if such materials were present, it would adversely affect the quality of the product produced at the plant.

The toxicity of the slag was tested using the Toxicity Characteristic Leaching Procedure ("TCLP"), the Synthetic Precipitation Leaching Procedure ("SPLP"), and the Chronic Whole Effluent Toxicity test (utilizing Fathead Minnows and *Ceriodaphnia dubia*). The TCLP test is conducted by leaching the sample with a solution of glacial acetic acid at a pH of approximately 2.9 and analyzing the resulting leachate. The SPLP test is similarly conducted with a solution of sulfuric and nitric acid at a pH of 5.0. In alkaline environments typical of Utah, these tests simulate worst-case leaching of a material due to acidic rainfall.

Results of the TCLP, SPLP, and effluent toxicity tests are provided in Appendix 106-3, with the TCLP and SPLP results also summarized in Table 106-4. As noted in the table, the slag meets the TCLP standards. No standards have been promulgated for the SPLP test, but the results included in Table 106-4 are substantially below the TCLP standards. These tests substantiate that the slag is neither leachable nor toxic. As a further indication of the lack of toxicity of the slag, the effluent toxicity results provided in Appendix 106-3 indicate no significant effect of slag leachate on growth, reproduction, and/or survival of the tested species. Since effluent toxicity tests generally overestimate the toxicity of a leachate, it can be concluded that runoff from the slag pile will not be toxic to aquatic life. Hence, its storage at the site will not cause adverse environmental impacts.

Results of analyses of the steel-mill scale are provided in Appendix 106-4. As indicated, this material consists predominantly of iron oxide. The material data safety sheet indicates that the mill scale is not significantly water soluble and that it is not a RCRA waste (i.e., it does not fail the TCLP test). Hence, storage of steel-mill scale at the site will not cause adverse environmental impacts. In fact, use of the mill scale and slag in the cement manufacturing process will result in beneficial recycling of materials that might otherwise be considered solid wastes.

Future operations will continue using similar practices.

No deleterious or acid-forming materials have been identified as naturally occurring on site. Additionally, no such materials are planned to be brought onto the site or to be left on the site in the future.

106.3 DISTURBED ACREAGE

Map 105-2 shows the extent of the disturbed area boundary for the three general areas of existing mine area (Pit 1), expansion mine area (Pit 2), and access roads. Table 106-2 breaks down the acreage of these existing and proposed disturbed areas.

106.4 NATURE AND TONNAGE OF MATERIAL MINED

The mineral deposits to be mined consist of high-quality, calcareous sandstone.

The quality of the minerals will determine the depth and extent of mining within the disturbed area boundary. For the current Ash Grove Cement Plant process, the alkali concentration determines the areas suitable for mining.

For the existing pit, the annual production rate has been approximately 100,000 tons per year since 1988. Therefore, the volume that has been mined is approximately 1,300,000 tons. Future mining production will be based on the cement plant production requirements. Therefore, no specific mining volumes can be projected. However, assuming an average mining production of 100,000 tons per year, and based on the projected area of mining, the mine has a life of over 50 years.

No waste materials are generated as part of the mining. Also, no other wastes other than trash are generated at the facility. Therefore, the mining operation currently contains no major waste disposal areas. Trash disposal is discussed in Section 106.9.

106.5 SOIL MATERIALS

Within the disturbed and adjacent areas of the mine the soils generally consist of six soil types or associations, based on the U.S. SCS soil survey for the Fairfield-Nephi Area, which includes parts of Juab, Sanpete, and Utah counties, Utah (Trickler and Hall, 1980). These soils are: Borvant cobbly loam; Donnardo stony loam; Juab loam; Lodar-Rock Outcrop Complex; Pharo very stony loam; and Reywat-Rock Outcrop Complex.

Typical descriptions of the soils are given in Appendix 106-1. Figure 106-1 depicts the location of surficial soils based on U.S. SCS mapping relative to the existing and proposed mining areas.

106.6 SOIL PROTECTION AND REDISTRIBUTION PLAN

The Nielson Sandstone Mine was opened in 1987. Approximately 25,000 CY of topsoil materials were salvaged and stockpiled from the areas of current disturbance. The soil stockpile is located to the southwest of the current pit area (see Map 105-2). Additional soil was salvaged from a portion of the Pit 1 area to the west, northwest of the pit highwall. Soils were stripped and pushed into a windrow at the boundary of the proposed development area (see Map 106-1).

During future expansion activities, the areas to be disturbed (Pit 1 expansion, Pit 2, and Pit 2 access road) will be stripped of the available soil materials. Based on site reconnaissance, the soils existing on-site are thin and variable in depth. In some portions of the site, the bedrock is exposed and no soils are present. In other areas, the soils are present in variable thickness. All reasonable efforts will be made to salvage the available suitable soil materials, from the area to be disturbed. Any material remaining, following the salvage operations will be used as mineral product.

Removal of topsoil will be accomplished by use of a dozer scraping the available topsoil into a pile. Due to the limited soil resource, all available soil materials will be required for reclamation efforts; therefore, no segregation of the soil layers will occur. Once stacked, the soil can be moved to a safe location using a loader and dump truck. The soil will be temporarily stockpiled, posted as soil material, and revegetated to prevent wind and water erosion.

Due to the proposed expansion of Pit 1 to the southwest, the existing topsoil stockpile will need to be moved. It is proposed that it be moved to the south along the access road, but outside of the pit expansion boundary. This location is indicated on Map 105-2.

For estimating purposes, due to the variability of the site soils, the thickness of the stripped material is assumed to be 6 inches over the disturbed area. Based on the extent of the proposed disturbance areas for the road and pits, assuming a salvage thickness of 6 inches, the total soil salvage volume will be approximately 106,560 CY. The soil from the area of Pit 1 has already been salvaged and is stored in the existing stockpile. The soil materials (approximately 7,300 CY) that will be stripped from the Pit 1 expansion area will be added to the existing Pit 1 stockpile. The remaining soil materials (approximately 74,260 CY) will be hauled to a new soil stockpile located adjacent to the Pit 2 access road (see Map 105-2).

Soils will remain in the stockpiles until the regraded slopes are ready for redistribution and placement of the stockpiled soil materials. The redistribution will be handled as described in Section 110.2.

106.7 VEGETATION BASELINE

In general, vegetation in the vicinity of the mine site is sparse. Premining vegetation for the existing pit area consisted of Utah Juniper with an understory of wheatgrass, bluegrass and sagebrush. Based on a 1987 study conducted by Mr. Frank Jensen of the Utah Division of Oil, Gas, and Mining, the ground cover from vegetation was estimated to be 12 percent (see the attached memo in Appendix 106-2). This is felt to be representative of the Pit 1 area.

Since the original study was completed, the area surrounding the existing mine and in the area proposed for Pit 2 was damaged by a wildfire that occurred in 1996. Based on site review, the area is starting to recover from the fire. Dr. Val Anderson, Professor of Botany and Range Science at Brigham Young University, conducted an ocular vegetative assessment of the area proposed for Pit 2 and surrounding area in the fall of 2001. Based on his assessment, two vegetative communities were identified in the Pit 2 area (see Figure 106-2). One of the communities has both burned and unburned portions. These will be addressed as if they are different communities. The majority of the Pit 1 area was described as a single community (Grassy Ridge) with small pockets of other vegetation communities. The following descriptions are provided for these four vegetative communities.

North slope community - This area was previously dominated by a Utah juniper - mixed brush - bluebunch wheatgrass community, but was burned by wildfire in 1996 eliminating all of the woody species. The juniper skeletons were left standing. The soil has a well-developed small rocky pavement surface and perennial grasses, particularly bluebunch wheatgrass with some Sandbergs bluegrass and squirreltail, now dominate the site. There is a very low density of annual weedy species present, including cheatgrass, peppergrass, and tumblemustard.

Ridgetop and south slope community - Burned - Utah juniper trees and a weak component of shrubs and grasses also previously dominated this area. The 1996 fire burned this area completely and it was subsequently seeded and chained by the U.S. Bureau of Land Management. A result of the chaining was a disruption of the rocky pavement in an effort to improve the seedbed. Few of the native grasses have responded from the chaining; however, some of the seeded species have become established. The vegetative cover is substantially lower than that of the north slope and is best on the ridge top and decreases on the south slope. Perennial grasses include bluebunch wheatgrass, squirreltail, Sandbergs bluegrass, Indian ricegrass, Intermediate wheatgrass and crested wheatgrass. Annual weeds make up a substantial component of the community and include cheatgrass, peppergrass, tumblemustard, and others.

Ridgetop and south slope community - Unburned - This area is adjacent to the burned areas and is dominated by Utah juniper, Wyoming big sagebrush, broom snakeweed, bluebunch wheatgrass and Sandbergs bluegrass. There is a relatively low density of cheatgrass and other annual weeds. The small rocky pavement soil surface covers most of the relatively large plant interspaces.

Grassy ridge community - Burned - This community occurs mainly in the Pit 1 area and appears to have been dominated by herbaceous cover with a few Utah juniper trees and mixed shrubs scattered within. The area was burned in 1996, which eliminated the majority of the woody species. The site is now dominated by bluebunch wheatgrass with lower densities of Sandbergs bluegrass and Indian ricegrass. There is a substantial annual weedy component dominated by cheatgrass.

As the proposed Pit 2 area has limited amounts of the Grassy Ridge vegetative community, cover data were collected for the remaining communities in the spring of 2002. Within each these three communities, 3 thirty meter transects were placed using a stratified random approach and 10 quarter meter quadrats spaced at 3 meter intervals along each transect were evaluated. Canopy cover, frequency, and nested frequency were recorded for all species occurring in each quadrat. Data are summarized by species for those occurring in at least 15 percent of the quadrats in a given community. Species occurring less frequently were grouped into other perennial and other annual category. Table 106-3 presents the data for each of the communities.

No mining outside of the current mine boundaries will occur until the Division accepts this addendum.

106.8 GEOLOGY AND HYDROLOGY BASELINE

The sandstone beds that are being mined are part of the Permian Oquirrh Formation. This formation consists of interbedded sandstone and cherty dolomite layers. The sandstone layers consist of the fine to medium grained, pale reddish brown calcareous sandstone. The dolomite layers consist of light olive gray to dark gray, medium-bedded, arenaceous dolomite (Higgins, 1981).

Due to the Leamington Canyon and Tintic Valley Thrust Faults located in the area, the strata are warped at an extreme angle (Higgins, 1981). Therefore, the mining at the site is along the dip of the formation with depth.

Strata in the mine area are located above the level of the Sevier River (elev. 4,850 feet) located approximately 2.5 miles to the southeast of the mine site. These strata are unsaturated and, therefore, are not considered to be aquifers. The bottom of the expanded Pit 1 (i.e., the lowest elevation to be mined under this plan) is approximately 370 feet above the river elevation.

EarthFax conducted a spring and seep inventory of the mine area in the fall of 2001. The inventory identified no spring or seep locations on or near the mine area.

Surface drainages in the area are ephemeral in nature and only flow in direct response to precipitation. To date, the pit area is located out of any drainage. Ash Grove has created a series of diversion berm structures to prevent the undisturbed runoff from affecting the operation facilities.

106.9 FACILITIES LAYOUT

The facilities utilized for the Nielson Sandstone Mine consist of three general areas; Existing area (Pit 1), Expansion area (Pit 2), and access road area. These areas are presented on Map 105-2.

The existing pit encompasses the majority of the proposed Pit 1 expansion area. This area includes the existing pit and temporary stockpiles. The existing pit consists of a single bench highwall 45 to 50 feet high at a 1V: 0.5H slope. The proposed future expansion will enlarge the pit to the west-southwest and modify the shape and slope of the single-bench pit.

The proposed Pit 2 is located in the northeast portion of the claim area (see Map 104-1). This pit will be mined as a repeated single bench pit (see Map 106-2).

For Pit 1, the final pit slopes will be at an angle of 3H: 1V over most of their length. In Pit 2, the north and northwest slopes will be steeper at 2H: 1V. Any remaining slopes will be at 3H: 1V.

All other areas will daylight to match existing topography. The steeper slope, while more difficult to reclaim, will be implemented to minimize the extent of the disturbed area.

The access road will be extended to provide access to the proposed Pit 2 area. This road will require the crossing of four small ephemeral drainages. Section 107.2 discusses the hydrology calculations and culvert sizing for these crossings.

All-weather access roads - The mine access roads are located between the State Highway 132 and the pit areas. Typical road cross-sections and culvert crossing details are presented in Figures 106-3 and 106-4. The locations of the access roads are presented in Maps 105-2 and 106-3.

Unimproved roads - There are a number of unimproved road segments (two track roads) that exist within the mine area. These roads are used for access to the various areas of the pit, other miscellaneous facilities and for access to the BLM grazing lands north of the mine. Map 105-2 presents to the location of these roads.

These roads have been constructed with a minimal amount of ground disturbance. Generally, the roads are used without any grading. Some minor grading has occurred on those roads within the mine area. Maintenance is performed as needed to repair damage caused by storm water runoff.

TABLE 106-1

CHEMISTRY BREAKDOWN OF TEMPORARY STORED MATERIALS

CONSTITUENTS	SHALE (% mass)	STEEL-MILL SCALE (% mass)	SLAG (% mass)
SiO_2	55	1.9-10	15.5
Al_2O_3	22	0.4-2.2	9.06
FE_2O_3	5.6	70.03-94.3	27.5
CaO	9.3	3.8-12.8	35
MgO	0.84	0.9-4.7	12.6
SO_3	0.04	0.01-0.05	0.22
NA_2O	0.51	0.04-0.083	0.08
K_2O	1.3	0.01-0.061	0.04
TiO_2	0.88	0.04-0.077	-
Misc	4.53	-	-
Total	100	100	100

TABLE 106-2

ACREAGE BREAKDOWN

Area	Acres
Pit 1	32.4
Pit 2	92.7
Access Roads	7.0
Total	132.1

TABLE 106-3

VEGETATION DATA SUMMARY

Species	Cover	Composition	Frequency	Nested Frequency
Northslope Community (burned and unchained)				
Bluebunch wheatgrass	9.47	43.4	70.0	1.8
Sandberg's bluegrass	4.73	21.7	83.3	2.4
Other perennials	0.70	3.2		
Cheatgrass	5.83	26.7	86.7	2.7
Other annuals	1.10	5.0		
Total	21.83			
Ridgetop and Southslope Community (unburned and unchained)				
Bluebunch wheatgrass	7.30	47.4	60.0	1.4
Sandberg's bluegrass	1.70	11.1	53.3	1.2
Big Sagebrush	3.47	22.5	20.0	0.4
Other perennials	0.70	4.5		
Cheatgrass	1.13	7.4	93.3	2.4
Peppergrass	0.57	3.7	50.0	1.4
Other annuals	0.53	3.4		
Total	15.4			
Ridgetop and Southslope Community (burned, reseeded, and chained)				
Bluebunch wheatgrass	0.60	6.6	23.3	0.5
Sandberg's bluegrass	0.47	5.2	20.0	0.3
Intermediate wheatgrass	1.57	17.2	46.7	1.1
Crested wheatgrass	1.33	14.6	43.3	1.1
Other perennials	1.34	14.7		
Cheatgrass	2.60	28.5	96.7	2.8
Peppergrass	0.70	7.7	36.7	1.1
Tumble mustard	0.23	2.5	16.7	0.3
Other annuals	0.27	3.0		
Total	9.11			

Other species encountered at low frequencies across the three communities:

Mexican cliffrose	Green rabbitbrush	Broom snakeweed
Scarlet globemallow	Yellow sweetclover	Alfalfa
Lewis flax	Small burnette	Goatsbeard
Storkbill	Burr buttercup	Russian thistle
Tapertip hawksbeard	Astragalus spp	Bottlebrush squirreltail
Indian ricegrass	Needle and thread grass	Red three awn

TABLE 106-4

Results of TCLP and SPLP Analyses on Slag

Analyte	SPLP Concentration (mg/l)[a]	TCLP Concentration (mg/l)		
		May 2001 sample	Mar 2005 sample	Standard[c]
Arsenic	<0.10	<2.0	<0.10	5.0
Barium	0.091	<0.050	0.10	100.0
Cadmium	<0.030	<0.030	<0.030	1.0
Chromium	<0.050	<0.050	<0.050	5.0
Lead	<0.10	<0.10	<0.10	5.0
Mercury	<0.050	<0.050	<0.0010	0.2
Selenium	<0.10	<0.50	<0.10	1.0
Silver	<0.10	<0.10	<0.10	5.0

[a] Synthetic Precipitation Leaching Procedure (EPA Method 1312)
[b] Toxicity Characteristic Leaching Procedure (EPA Method 1311)
[c] See 40 CFR 361.24

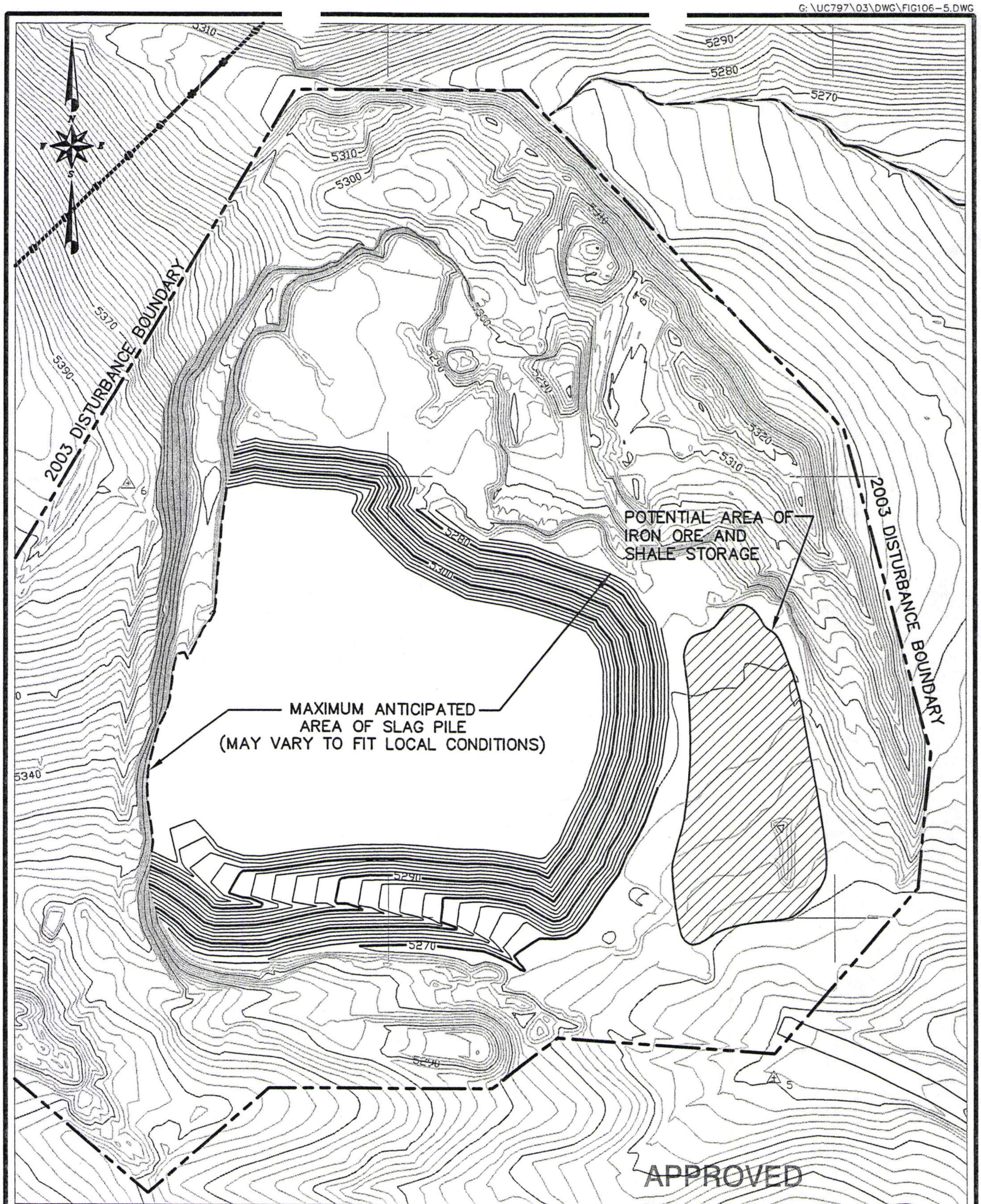

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FIGURE 106-5. MATERIALS STORAGE IN PIT 1.

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APPENDIX 106-3

RESULTS OF SLAG TOXICITY TESTING

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INORGANIC ANALYSIS REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

Client: Heckett MultiServ
Date Sampled: May 9, 2001
Project: 12-170885

Contact: Karen Kiggins
Date Received: May 9, 2001

Lab Sample ID:
L45866-02A

Field Sample ID:
Steel Furnace Slag

53 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Free (888) 263-8686
Fax (801) 263-8687

TCLP METALS Method 1311

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Amount Detected
Arsenic	mg/L	5/11/01	6010B	2.0	< 2.0
Barium	mg/L	5/11/01	6010B	0.050	< 0.050
Cadmium	mg/L	5/11/01	6010B	0.030	< 0.030
Chromium	mg/L	5/11/01	6010B	0.050	< 0.050
Lead	mg/L	5/11/01	6010B	0.10	< 0.10
Mercury	mg/L	5/16/01	7470A	0.050	< 0.050
Selenium	mg/L	5/11/01	6010B	0.50	< 0.50
Silver	mg/L	5/11/01	6010B	0.10	< 0.10

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Released by: [signature]
Laboratory Supervisor

Report Date: May 21, 2001

INORGANIC ANALYSIS REPORT

AMERICAN WEST ANALYTICAL LABORATORIES

Client: MultiServ

Date Sampled: March 14, 2005

Project:

Contact: Karen Kiggins

Date Received: March 15, 2005

Lab Sample ID: L64849-01A

Field Sample ID: BOF Slag

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
e-mail: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

TCLP METALS Method 1311

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	
Arsenic	mg/L	3/17/2005 2:33:04 PM	6010B	0.10	< 0.10	
Barium	mg/L	3/17/2005 2:33:04 PM	6010B	0.050	**0.10**	
Cadmium	mg/L	3/17/2005 2:33:04 PM	6010B	0.030	< 0.030	
Chromium	mg/L	3/17/2005 2:33:04 PM	6010B	0.050	< 0.050	
Lead	mg/L	3/17/2005 2:33:04 PM	6010B	0.10	< 0.10	
Mercury	mg/L	3/17/2005	7470A	0.0010	< 0.0010	
Selenium	mg/L	3/17/2005 2:33:04 PM	6010B	0.10	< 0.10	[1]
Silver	mg/L	3/17/2005 2:33:04 PM	6010B	0.10	< 0.10	

[1] Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

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Released by: [signature]

Laboratory Supervisor

Report Date: March 21, 2005

American West Analytical Labs

WORK ORDER Summary

15-Mar-05

Work Order L64849

RUSH

Client ID: MUL100

Project:

QC Level: QC 1

Comments: 5 Day Rush

Sample ID	Client Sample ID	Collection Date	Date Received	Date Due	Matrix	Test Code	Storage	
L64849-01A	BOF Slag	3/14/2005	3/15/2005	3/22/2005	Soil	1311LM	tclp	1
				3/22/2005		3005A-TCLP	tclp	
				3/22/2005		HG-PREP-TCLP	tclp	
				3/22/2005		HG-TCLP	tclp	
				3/22/2005		ICP-TCLP	tclp	

64849

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Client Multiserv
Address P.O. Box 5
Provo UT 84603
City State Zip
Phone 801-225-0373 Fax 801-225-1194
Contact Karen Kiggins
E-mail KKiggins@multiserv.com
Project Name BOF SLAG
Project Number/P.O.#
Sampler Name Karen Kiggins

AMERICAN WEST ANALYTICAL LABORATORIES
463 West 3600 South
Salt Lake City, Utah 84115
(801) 263-8686
(888) 263-8686
Fax (801) 263-8687
Email:awal@awal-labs.com

CHAIN OF CUSTODY

Lab Sample Set # 64849-5day 648 1-III
Page 1 of 1

Turn Around Time (Circle One)
1 day QC | 2 day 1 | 3 day 2 | 4 day 2+ | 5 day 3 | 3+ | Standard 4

Please indicate tests needed below

Sample ID	Date/Time Collected	Matrix	Number of Containers (Total)	TCLP (8)	SPLP (8)	COMMENTS
BOF SLAG SPLP	3/14/05	S	1	~~X~~ RW	X	SPLP - III
BOF SLAG TCLP	3/14/05	S	1	X	~~X~~ RW	TCLP - 5 day

LABORATORY USE ONLY

SAMPLES WERE:
1 Shipped or hand delivered
Notes:
2 Ambient or Chilled
Notes:
3 Temperature 20°C
4 Received Broken/Leaking (Improperly Sealed)
Y N
Notes:
5 Properly Preserved
Y N
Notes:
6 Received Within Holding Times
Y N
Notes:

COC Tape Was:
1 Present on Outer Package Y N NA
2 Unbroken on Outer Package Y N NA
3 Present on Sample Y N NA
4 Unbroken on Sample Y N NA
Notes:

Discrepancies Between Sample Labels and COC Record? Y N
Notes:

Relinquished By: Signature [signature] / PRINT NAME Karen Kiggins	Date 3/15/05 / Time 11:26	Received By: Signature [signature] / PRINT NAME REBEKAH WINKLER
Relinquished By: Signature / PRINT NAME	Date / Time	Received By: Signature / PRINT NAME
Relinquished By: Signature / PRINT NAME	Date / Time	Received By: Signature / PRINT NAME
Relinquished By: Signature / PRINT NAME	Date / Time	Received By: Signature / PRINT NAME

Special Instructions:

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INORGANIC ANALYSIS REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

Client: MultiServ
Date Sampled: March 14, 2005
Project:

Contact: Karen Kiggins
Date Received: March 15, 2005

Lab Sample ID:
L64850-01A

Field Sample ID:
BOF Slag

SPLP Metals Method 1312

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Amount Detected
Arsenic	mg/L	3/17/2005 1:47:01 PM	6010B	0.10	< 0.10
Barium	mg/L	3/17/2005 1:47:01 PM	6010B	0.050	**0.091**
Cadmium	mg/L	3/17/2005 1:47:01 PM	6010B	0.030	< 0.030
Chromium	mg/L	3/17/2005 1:47:01 PM	6010B	0.050	< 0.050
Lead	mg/L	3/17/2005 1:47:01 PM	6010B	0.10	< 0.10
Mercury	mg/L	3/17/2005	7470A	0.050	< 0.050
Selenium	mg/L	3/17/2005 1:47:01 PM	6010B	0.10	< 0.10
Silver	mg/L	3/17/2005 1:47:01 PM	6010B	0.10	< 0.10

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
e-mail: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

APPROVED
JUN 30 2005
DIV. OIL GAS & MINING

Released by: [signature]
Laboratory Supervisor

Report Date: March 18, 2005

American West Analytical Labs

WORK ORDER Summary

15-Mar-05

Work Order L64850

Client ID: MUL100

Project:

Comments: Rush Level 3

QC Level: QC 1

RUSH

HOK IT

Sample ID	Client Sample ID	Collection Date	Date Received	Date Due	Matrix	Test Code	Storage	
L64850-01A	BOF Slag	3/14/2005	3/15/2005	3/18/2005	Solids	1312LM	splp	1
				3/18/2005		3005A-TCLP	splp	
				3/18/2005		Hg-prep-W	splp	
				3/18/2005		HG-W	splp	
				3/18/2005		ICP-W	splp	

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DIV. OIL GAS & MINING

Client Multiserv
Address P.O. Box 5
Provo UT 84603
City State Zip

Phone 801-225-0373 Fax 801-225-1194

Contact Karen Kiggins
E-mail KKiggins@multiserv.com
Project Name BOF SLAG
Project Number/P.O.#
Sampler Name Karen Kiggins

AMERICAN WEST ANALYTICAL LABORATORIES
463 West 3600 South
Salt Lake City, Utah 84115
(801) 263-8686
(888) 263-8686
Fax (801) 263-8687
Email:awal@awal-labs.com

CHAIN OF CUSTODY

Lab Sample Set # 64849 - 5day
6485 - III

Page 1 of 1

Turn Around Time (Circle One)
1 day 2 day 3 day 4 day 5 day Standard
QC 1 2 2+ 3 3+ 4

Please indicate tests needed below

Sample ID	Date/Time Collected	Matrix	Number of Containers (Total)	TCLP (8)	SPLP (8)								COMMENTS
BOF SLAG SPLP	3/14/05	S	1	~~X~~	X								SPLP - III
BOF Slag TCLP	3/14/05	S	1	X	~~X~~								TCLP - 5 day

Relinquished By: Signature	Date	Received By: Signature
Karen Kiggins	3/15/05	Rebekah Winkler
PRINT NAME Karen Kiggins	Time 11:26	PRINT NAME REBEKAH WINKLER
Relinquished By: Signature	Date	Received By: Signature
PRINT NAME	Time	PRINT NAME
Relinquished By: Signature	Date	Received By: Signature
PRINT NAME	Time	PRINT NAME
Relinquished By: Signature	Date	Received By: Signature
PRINT NAME	Time	PRINT NAME

Special Instructions:

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LABORATORY USE ONLY

SAMPLES WERE:
1 Shipped or hand delivered
Notes:
2 Ambient or Chilled
Notes:
3 Temperature 20°C
4 Received Broken/Leaking (Improperly Sealed)
Y N
Notes:
5 Properly Preserved
Y N
Notes:
6 Received Within Holding Times
Y N
Notes:

COC Tape Was:
1 Present on Outer Package Y N NA
2 Unbroken on Outer Package Y N NA
3 Present on Sample Y N NA
4 Unbroken on Sample Y N NA
Notes:

Discrepancies Between Sample Labels and COC Record?
Y N
Notes:

Chronic Whole Effluent Toxicity Report

Fathead Minnows

DATE: July 22, 1996

CUSTOMER ID: Heckett MultiServe SAMPLE ID: Steel Slag

TEST *(Animal/Age)*: Fathead Minnow <24 hours

SAMPLE *(Date/Type)*: Soil grab (Leachate)

DATE/TIME TEST BEGAN: 7/08/96 4:45 pm

DATE/TIME TEST COMPLETED: 7/15/96 6:45 pm

TEST CONDITIONS

Fathead Minnow larvae were exposed to diluted Leachate for 7 days. At the end of the test period, Survival and Growth were measured and statistically evaluated against a Control to determine if Chronic Toxicity was present in the sample.

Animal Age at Test Start	<24 hours
Number of Organisms/Dilution Volume/Replicates	10 organisms/150 ml/4 replicates
Food	Fed twice daily 0.1 ml newly hatched brine shrimp.
Aeration	None required.
Dissolved Oxygen	Measured daily old/new.
Water Replacement	Renewed daily.
Temperature	25 $\pm$ 1 degree C.
Photo Period	16 hours light 8 hours dark.
pH	Measured initially and at 24 hours each day.
Dilution Water	Reconstituted lab water (100 mg/L of hardness).
Receiving Water	Unknown
Sample Concentrations	Control, 6.25%, 12.5%, 25%, 50%, 100%.

SUMMARY

Results: X Pass Fail

There was NO significant effect on growth. (Results of Dunnett's Test)

NOEC (Growth) = >100% Critical T = 2.41

LOEC (Growth) = >100% Statistical T from Test for 100% = -3.569

There was NO significant effect of survival. (Results of Steel's Many-One Rank Test)

NOEC (Survival) = >100% Critical Rank = 10

LOEC (Survival) = >100% Statistical Rank calculated = 18.00

Enclosed are data sheets and statistical reports.

Sincerely,

Lee Rawlings

Lee Rawlings
Water & Environmental Testing, Inc.

Enclosure

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Water & Environmental Testing Inc. ... West 50 North ... Spanish Fork Utah 84003 (801)756-8397

Chronic Whole Effluent Toxicity Report

Ceriodaphnia

DATE: July 22, 1996

CUSTOMER ID: Heckett MultiServe **SAMPLE ID:** Steel Slag

TEST ***(Animal/Age)*****:** Ceriodaphnia dubia <8 hours

SAMPLE ***(Date/Type)*****:** Soil grab (Leachate)

DATE/TIME TEST BEGAN: 7/08/96 7:00 pm

DATE/TIME TEST COMPLETED: 7/16/96 10:00 pm

TEST CONDITIONS

Ceriodaphnia dubia neonates were exposed to diluted Leachate as specified by the method.` At the end of the test period survival and reproduction were measured and statistically evaluated against a control to determine if Chronic Toxicity was present in the sample.

Animal Age at Test Start	< 8 hours.
Number of Organisms/Dilution Volume/Replicates	1 organisms/15 ml/10 replicates
Food	Fed once daily 0.1 ml YTC and algae.
Aeration	None required.
Dissolved Oxygen	Measured daily old and new.
Water Replacement	Renewed daily.
Temperature	25 ± 1 degree C.
Photo Period	16 hours light 8 hours dark.
pH	Measured initially and at 24 hours each day.
Dilution Water	Reconstituted Lab water (100 mg/L hardness).
Receiving Water	Unknown
Sample Concentrations	Control, 6.25%, 12.5%, 25%, 50%, 100%.

SUMMARY

Results: X Pass Fail

There was NO significant effect on reproduction. (Results of Steel's Many-One Rank Test)

NOEC (Reproduction) = >100% Critical Rank = 75

LOEC (Reproduction) = >100% Statistical T from Test for 100% = 96.5

There was NO significant effect of survival. (Results of Fisher Exact Test)

NOEC (Survival) = >100%

LOEC (Survival) = >100%

Enclosed are data sheets and statistical reports.

Sincerely,

Lee Rawlings

Lee Rawlings
Water & Environmental Testing, Inc.

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Enclosure

APPENDIX 106-4

STEEL MILL SCALE ANALYSES AND MSDS

WYOMING ANALYTICAL LABORATORIES, INC.
1511 Washington Ave.
Golden, CO 80401
www.wal-lab.com
Email: walxray@aol.com
(303) 278-2446
Fax: (303) 278-2439

July 19, 2004

Mr. Charles N. Speltz
Ferrous American
2100 Willow Lane
Lakewood, CO 80215

Denver Div. # 04470-1
Sample ID: Mill Scale

CHEMICAL ANALYSIS
WT%, DRY BASIS

Silicon Dioxide, SiO_2	1.92	
Aluminum Oxide, Al_2O_3	0.43	
Iron Oxide, Fe_2O_3	94.34	
Total (SiO_2 + Al_2O_3 + Fe_2O_3)		96.69
Calcium Oxide, CaO	3.80	
Magnesium Oxide, MgO	0.89	
Sodium Oxide, Na_2O	0.04	
Potassium Oxide, K_2O	0.01	
Titanium Dioxide, TiO_2	0.04	
Manganese Dioxide, MnO_2	1.21	
Phosphorus Pentoxide, P_2O_5	0.08	
Strontium Oxide, SrO	0.01	
Barium Oxide, BaO	0.01	
Sulfur Trioxide, SO_3	0.01	
Loss on Ignition	-2.81	
Moisture, as Received	1.78	

Charles R. Wilson
Division Manager

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DIV. OIL GAS & MINING

MEMBER
ACIL

MATERIAL SAFETY DATA SHEET

FERROUS AMERICAN COMPANY
P.O. Box 260678
Littleton, CO 80163-0678
TELEPHONE: (303)-267-0668
FAX: (303)-267-0680

I. PRODUCT IDENTIFICATION

TRADE NAME:	MILLSCALE
GENERIC NAME:	STEEL MILL SCALE
CHEMICAL NAME:	IRON OXIDE
FORMULA:	FERROUS OXIDE AND ELEMENTAL IRON
ORIGIN:	STEEL MILLS IN COLORADO, KANSAS, TEXAS AND UTAH

II. PRODUCT INGREDIENTS

COMPONENTS	C.A.S. NUMBER	PERCENTAGE	OSHA PEL	ACGIHTLV
IRON	7439-89-6	<99.0 %	10 (TWA-FUME)	5 (TWA-FUME)
CHROMIUM	7440-47-3	< 0.01 %	1.0 (TWA)	0.5 (TWA)
NICKEL	7440-02-0	< 0.02 %	1.0 (TWA)	1.0 (TWA)
MANGANESE	7439-96-5	< 0.10 %	1 (TWA-FUME)	1.0 (TWA-FUME)
ZINC	7440-66-6	< 0.10 %	5 (TWA-FUME)	5 (TWA-FUME)
LEAD	7439-92-1	< 0.01 %	0.05 (TWA)	0.15 (TWA)
MOLYBDENUM	7439-98-7	< 0.10 %	5 (TWA SOL COM)	5 (TWA SOL COM)
ALUMINUM	7429-90-5	< 0.10 %	10 (TWA-DUST)	10 (TWA-DUST)
COPPER	7440-50-8	< 0.10 %	0.1 (TWA-FUME)	0.2 (TWA-DUST)
SILICON	7440-21-3	< 1.00 %	10 (TWA-DUST)	10 (TWA-DUST)
TITANIUM	7440-32-6	< 0.10 %	10 (TWA)	10 (TWA)
TUNGSTEN	7440-33-7	< 0.10 %	5 (TWA)	5 (TWA)
CADMIUM	7440-43-9	< 0.10 %	0.1 (TWA-FUME)	0.05 (CdO)
CARBON	7440-44-0	< 0.10 %	3.5 (TWA)	3.2 (TWA)

ATTACHED CHEMICAL DATA IS ATTACHED AS PART OF THIS MSDS. INFORMATION PROVIDED IN THE ATTACHED ANAYSIS IS TYPICAL BUT NOT REPRESENTATIVE OF ANY SINGLE SHIPMENT OR LOT.

III. PHYSICAL DATA

APPEARANCE:	BLACK OR BROWN COURSE POWDER
ODOR:	ODORLESS
BOILING POINT:	NOT APPLICABLE
VAPOR PRESSURE:	NOT APPLICABLE
SPECIFIC GRAVITY:	7.8 (WATER = 1.0)
MELTING POINT:	2400ºF
WATER SOLUBILITY:	INSIGNIFICANT

IV. FIRE AND EXPLOSION DATA

FLASH POINT:	NON-FLAMMABLE
FIRE HAZARDS:	NONE, NOT FLAMMABLE
EXPLOSION HAZARDS:	NONE, NOT EXPLOSIVE

V. REACTIVITY DATA

STABLE UNDER NORMAL CONDITIONS OF USE, STORAGE AND TRANSPORT. WILL REACT WITH STRONG ACID TO LIBERATE HYDROGEN. AT TEMPERATURES ABOVE THE MELTING POINT, MAY RELEASE FUMES CONTAINING OXIDES OF IRON AND OTHER ALLOYING ELEMENTS.

VI. HEALTH HAZARDS

A. SUMMARY/RISKS:

SUMMARY:	CHRONIC INHALATION OF IRON OXIDE DUST MAY CAUSE BENIGN PNEUMOCONIOSIS (SIDEROSIS). INHALATION OVER LONG PERIODS OF HIGH AMOUNTS OF ANY DUST MAY OVERLOAD LUNG CLEARANCE MECHANISM AND RENDER THE LUNGS MORE VUNERABLE TO RESPIRATORY DISEASE.
MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED:	PRE-EXISTING UPPER RESPIRATORY AND LUNG DESEASE SUCH AS BRONCHITIS, EMPHYSEMA, OR ASTHMA.
TARGET ORGANS:	LUNGS OR EYES
ENTRY ROUTES:	INHALATION OR CONTACT WITH EYES
ACUTE HEALTH EFFECT:	TRANSITORY UPPER RESPIRATORY IRRITANT. EYE IRRITATION IF DUST IS RUBBED INTO EYES.

B. SIGNS OR SYMPTOMS OF OVEREXPOSURE:

INHALATION:	COUGHING, IRRITATION OR CONGESTION OF NOSE AND THROAT.
EYES:	TEMPORARY IRRITATION, REDNESS OR INFLAMMATION.
INGESTION:	NOT HAZARDOUS. GENERALLY CONSIDERED SAFE BY THE EPA BUT COULD CAUSE GASTRO-INTESTINAL UPSET.
SKIN CONTACT:	NON HAZARDOUS
SKIN ABSORPTION:	NOT ABSORBED

C. FIRST AID PROCEDURES:

INHALATION:	LEAVE DUSTY AREA, DRINK WATER TO CLEAR THROAT, BLOW NOSE TO CLEAR CONGESTION.
EYES:	DO NOT RUB EYES! WASH EYES TO REMOVE DUST; CONSULT A PHYSICIAN IF IRRITATION PERSISTS.

VII. SPILL OR LEAK PROCEDURES

SPILL OR LEAK:	PICK UP WITH VACUUM, BROOM OR SHOVEL.
WASTE MANAGEMENT:	NOT A HAZARDOUS WASTE BY RCRA (40 CFR PART 261) RETURN SPILLED MATERIAL TO INVENTORY.

VIII. SPECIAL PROTECTION INFORMATION

SAFETY GLASSES:	GENERALLY NOT REQUIRED
GOGGLES:	SHOULD BE WORN IN WINDY OR DUSTY CONDITIONS.
GLOVES:	GENERALLY NOT REQUIRED.
RESPIRATOR:	GENERALLY NOT REQUIRED.
VENTALATION:	IF HANDLED INDOORS MAINTAIN ADEQUATE EXHAUST VENTILATION OR DUST COLLECTION TO MAINTAIN DUST LEVELS BELOW PEL.

IX. MISCELLANEOUS INFORMATION

AS OF THE DATE OF PREPARATION OF THIS DOCUMENT, THE FOREGOING INFORMATION IS BELIEVED TO BE ACCURATE AND IS PROVIDED IN GOOD FAITH TO COMPLY WITH APPLICABLE FEDERAL AND STATE LAW(S). HOWEVER, NO WARRANTY OR REPRESENTATION WITH RESPECT TO SUCH INFORMATION IS INTENDED OR GIVEN.

PREPARED BY: CHARLES N. SPELTZ, PE
VICE PRESIDENT
MAY 29, 1996

APPROVED
JUN 30 2005
DIV. OIL GAS & MINING

SECTION 107 - OPERATION PRACTICES

107.1 PUBLIC SAFETY AND WELFARE

107.1.1 Shafts

There are no shafts are associated with the Nielson Sandstone Mine facilities.

107.1.2 Waste Disposal

Trash and other debris are collected and hauled to the Nephi landfill. Sewage is collected in portable toilets during the temporary mining periods and hauled off following mining. All waste materials associated with the mining operation will be properly disposed of in an approved off-site landfill.

107.1.3 Exploration Plugging Program

Exploration has been conducted by Ash Grove on and around the mine area. A description of the plugging program is presented in Section 108.

107.1.4 Warning Signs

Access to the site is by an all-weather road from the State Highway 132. Warning signs are posted along the access road from the State Highway. As blasting will be occurring as part of the mining operation, a blasting protocol has been implemented by Ash Grove. Appendix 107-1 presents a copy of the blasting procedure. A sign will be placed at the mine road entrance to alert the public to the plan.

107.1.5 Highwall and Excavation Protection

Highwalls or significant excavations exist on the property. The tops of highwalls for the existing pit are protected by berms to prevent vehicular access. Future pit expansion will also have berms located at the top of the highwalls. Also for both the existing pit and future expansion areas, the final slopes of the highwall will be reduced to 3H: 1V and 2H: 1V to reduce the safety hazard.

107.2 DRAINAGES

The pit sites are located near the crest of local hills. Therefore, the drainages flowing to the pit areas are quite limited in areal extent. Additionally, the safety berms along the top of the highwalls and pit slopes prevent runoff from the limited areas above the pits from entering the pits.

The proposed access road to the Pit 2 area will cross four ephemeral drainages. The SCSHydro peak flow computer program (Hawkins and Marshall, 1980) was used to determine the anticipated flows at these road crossings. Culverts are proposed for the crossings allowing conveyance the peak flows from the 10-year, 6-hour storm. The downstream outlet areas will be protected by riprap to prevent erosion. It is estimated that the volume on riprap to be installed will be less than 4 cubic yards of 6-inch D_{50} rock for each culvert. Appendix 107-2 presents the calculations for peak flows, culvert sizing, and riprap sizing under operational conditions.

107.3 EROSION CONTROL

During operations, due to the limited area contributing to the pits, no specific runoff control facilities are planned for the facility to control runoff from the site. The runoff from the site will be assessed to determine if erosion or sedimentation is occurring in the downstream channels. If problems are encountered, Ash Grove will evaluate the options to control the problem and implement structures to control the erosion and sediment production from the site area.

107.4 DELETERIOUS MATERIALS

Other than excavation of the silica, no other processing will occur. Therefore, it is anticipated that no deleterious materials will be used on the site. Any materials that are used at the site will be properly disposed of and/or stored to ensure that adverse environmental effects are either eliminated or controlled to the extent possible.

The MSDS for the steel-mill scale (presented in Appendix 106-4) indicates that chronic inhalation of dust from the material can cause benign pneumoconiosis. However, with a specific gravity of 7.8 (as compared to a normal soil particle specific gravity of 2.65), it is highly unlikely that this material will become suspended in the air under any conditions other than extremely high winds. Hence, chronic (and even acute) exposure to the mill scale dust is highly unlikely. If dusty conditions prevail at the site when workers are present, all workers not in enclosed cabs will be encouraged to wear dust masks or leave the site during such conditions.

107.5 SOILS

Soils on the mine permit area will be protected in accordance with the requirements of Section 106.6 of this application. Existing soils will be stripped prior to disturbance in an area.

107.6 CONCURRENT RECLAMATION

The mining approach proposed at the Nielson Sandstone Mine pits will allow limited contemporaneous reclamation as the mining continues. Figure 107-1 presents a general schedule for currently anticipated mine operations. Due to variability of the mineral deposit and plant production chemistry requirements, development of a long-term projected mining sequence is not possible. Generally, the mining needs for the next year are determined based on the anticipated plant production. This schedule is based on current production requirements. These requirements may change with market conditions and plant production requirements.

For Pit 1, during continued mining to the west, southwest (see Map 106-1), the highwall on the north, northeast side of the pit will be reduced and graded to a 3H: 1V slope and reclaimed. As this work progresses, the pit floor area will be used for mining and temporary storage. Following the proposed additional mining in Pit 1, the remaining slopes of the pit will be regraded and reclaimed, while the pit floor will continue to be used for temporary storage for the remaining life of the operation.

Pit 2 will be mined as a repeated single bench pit commencing at the top of the ridge. As the lower levels of the mine develop, area of the pit will increase. Therefore, no contemporaneous reclamation is planned for this pit.

SECTION 109 - IMPACT ASSESSMENT

109.1 HYDROLOGY

The potential impact to the surface water systems from the Nielson Sandstone Mine is increased sedimentation from the pit areas. This potential impact is minimized by the flat floor of the mine pits and the limited drainage areas contributing to the pits allowing the sediment to settle out in the very slow moving runoff. Also, if significant sedimentation is noted, Ash Grove will assess and evaluate the problem and implement control structures to minimize the impact.

As indicated in Section 106.2, leachate generated from the slag and steel-mill scale stored at Pit 1 will not contain deleterious concentrations of pollutants. Hence, storage of this material will not adversely affect hydrologic or other environmental resources at the site.

109.2 THREATENED AND ENDANGERED SPECIES AND HABITAT

No threatened or endangered species or habitats are known to exist within or adjacent to the existing or proposed disturbed area associated with the Nielson Sandstone Mine. The Nielson Sandstone Mine has been operating at this site for almost 15 years. The impact of the mine on wildlife in the area has stabilized. Due to the infrequent operations at the site, no additional impacts to wildlife species are expected from expansion of the mine pit areas.

As the existing disturbed area expands, vegetation will be removed. Vegetation will be re-established in the area upon reclamation, as outlined in Section 110 of this permit application. Future reclamation activities will, over time, aid in the restoration of vegetative communities and wildlife habitats for those areas of the mine that are no longer needed for mine operations.

109.3 SOILS

Construction of the Nielson Sandstone Mine began after the passage of the Utah Mined Land Reclamation Act. Therefore, soil resources from the existing pit area were salvaged and are stockpiled for future use during reclamation. Any future mining disturbance will also involve the salvage, stockpiling, and redistribution of soil resources. Therefore, while future impacts to the soil resources of the area will occur; they will be temporary and assist in future reclamation of the site.

109.4 SLOPE STABILITY, EROSION, AIR QUALITY, AND PUBLIC HEALTH AND SAFETY

Mine activities in the existing Pit 1 have created a highwall due to mineral excavation. The existing pit highwall is 45- to 50-feet high with a 0.5H: 1V slope. To date, these highwalls have been stable and have not experienced significant erosion or mass wasting. As described in

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Section 106-9, the future pit reclamation activities in both pits 1 and 2 will lay the slopes back and eliminate highwalls.

During the active period of operations, a water truck is used as needed to control dust. Therefore, no dust problems exist from the operation.

Public health and safety are protected by posting warning signs and placing berms at the top of all highwalls.

109.5 MITIGATION ACTIONS

As discussed in this application, the actions proposed by the mine will help to minimize the impacts to the surface water system, minimize the loss of additional soil materials, and will, over time, aid in the reestablishment of vegetative communities and wildlife habitats.

SECTION 110 - RECLAMATION PLAN

110.1 CURRENT AND POSTMINING LAND USE

Prior land use(s): Rangeland, wildlife habitat, mineral exploration, and recreation.

Current land use(s): Mining, rangeland, wildlife habitat, and recreation.

Possible Projected or Prospective future land uses(s): Rangeland, wildlife habitat, recreation, mineral exploration.

110.2 RECLAMATION DESCRIPTION

GENERAL DESCRIPTION

This section presents a conceptual plan to reclaim the affected lands within the mine permit boundaries and blend the affected area into the surrounding undisturbed area once mining operations are completed.

Following the completion of mining operations in each phase, the mine phase will be contemporaneously reclaimed to meet the post-mining land use. At the completion of all mining, the site will blend into the surrounding topography. Maps 110-1, 110-2, and 110-3 present the proposed configuration of the final reclaimed mine area. For Pit 1 (see Map 110-1), it is assumed that all temporarily-stored material (i.e., slag, steel-mill scale, and shale) will be removed from the pit prior to the beginning of reclamation. If any of this material remains it will be pushed against the toe of the highwall prior to site grading. In any case, the mine slopes will be reclaimed at a 3H: 1V slope. Access to the top of the highwall will be by the two-track road along the soil windrow on the west side of the pit. This area will be drilled on a pattern to achieve a 3H: 1V slope and blasted to reduce the existing highwall slopes. Therefore, at the conclusion of mining, the final slope grading will be achieved using dozers to move the blasted materials to the final configuration.

If any temporarily-stored material (i.e., slag, steel-mill scale, or shale) remains at the site during reclamation, excess material blasted from the highwall that is not needed to achieve appropriate reclamation slopes will be spread uniformly over the temporarily-stored material. Under the worst-case scenario, if all of the slag remains at the site prior to reclamation, the quantity of subsoil and topsoil at the site is sufficient to cover the slag by 15 to 18 inches, depending on the swell factor of the blasted highwall. This depth of reclamation cover will increase as the slag is used (i.e., as will occur under the planned and historically proven scenario).

For Pit 2 (see Map 110-2), the mining will commence on the top of the ridge and mine sequential levels down to a flat floor at 5320 feet. The initial levels will daylight on all sides, except the northwest slope. This slope will be constructed at a 2H: 1V slope to minimize the disturbed area and to blend into the existing topography. Once the pit is mined out, the area will be close to the final configuration.

For both pits, the pit bottom will sub-drilled to a minimum of 3 feet as part of the development of the final level of the mine; therefore, the broken materials will function as the sub-soil layer in the reclamation. The pit areas will be ripped and recontoured to the final configuration. Then, the previously stripped soil will be redistributed on these areas. Revegetation of the mined areas will be conducted in accordance with Section 110.5.and then soil materials will be reseeded. Also, the small ephemeral drainages that were affected by the pit excavation or access roads will be reestablished as part of the final reclamation configurations. Section 111.2 discusses the reclamation of these drainages.

The texture, pH, and electrical conductivity of the slag were determined in case some of this material remains in the pit at the time of reclamation. Results of these analyses are presented in Appendix 110-1. As indicated, the slag is alkaline, indicating that metals in the material will not be mobile. The slag has a moderate salinity and is classified as a gravelly sand (USDA classification system) or a well-graded sand (Unified soil classification system). If roots penetrate the slag following reclamation, it is doubtful that the vegetation would experience metal-related toxicity problems since any potentially deleterious compounds are physically bound in the slag during the formation process. For this same reason, as well as the fact that the pH of the material will bind metals in the slag, it is doubtful that the slag will have a deleterious effect on the subsoil.

The pH of the slag is sufficiently high (12.6) that elemental sulfur will be added to any slag within 4 feet of the final reclaimed surface that remains in the pit at the time of reclamation. When acted upon by moisture and oxygen in the soil, sulfur will convert to sulfuric acid, thereby dissolving the calcium carbonate in the slag and reducing the pH. The quantity of sulfur required to approximately neutralize the pH of the near-surface slag has been calculated as outlined in Appendix 110-2. Concurrent with adding the sulfur, slag that will be within 4 feet of the final reclaimed surface will be ripped then cross-ripped to a depth of at least 3 feet to ensure that the slag is loosened sufficiently to allow penetration of the sulfur into the slag. The sulfur will be spread uniformly over the surface of slag that remains in place and worked into the soil to an appropriate depth using a ripper and tilling with a plow.

Following addition of the sulfur, the slag will be left unreclaimed for a period of approximately 1 year. The upper 2 feet of treated slag will then be tested for pH. Samples for pH analyses will be collected from the surface and at a depth of approximately 2 feet from one location for every acre of slag remaining at the site. If the pH of slag that will be within 4 feet of the final reclaimed surface remains above 9.0, additional sulfur will be added to the required areas as outlined above, allowed to react, and the slag will be re-tested. For the purpose of reclamation bond estimating, it is assumed that 50% of the slag will require additional treatment. Once the pH of the slag is below 9.0, reclamation will proceed as discussed below.

Any slag that is sulfur-treated to reduce its pH will be sampled following acidification. These samples will be collected from a depth of about 1 foot at a frequency of one sample for every 2 acres and analyzed for soluble aluminum, soluble manganese and leachable metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) using TCLP and SPLP methods (see Section 106.2). Alternative plans will be developed if these analyses prove problematic.

All roads within the pit areas will be reclaimed following mining (see Map 110-3). Some roadways (two track roads) in the mine area will remain following mining to access the BLM grazing lands north of the mine. Map 110-3 shows the location of the roads that will remain following reclamation activities. Efforts will be made to ensure that the roads to remain will not be directly through the reclaimed portions of the site. Access to the reclaimed site will be over these roads for periodic inspection the site.

The all-weather access roads will be reclaimed by removal of the asphalt surface, recontouring cut and fill sections to blend into surrounding topography, minimize and control erosion in accordance with Section 111.3 of this plan, and seeding for revegetation. The removed asphalt will be hauled to an appropriate off-site landfill.

The unimproved roads (two track roads) where soils have not been stripped will be reclaimed by ripping the road surface, to improve prospects of seeding success, minimal recontouring to blend into surrounding topography, and seeding.

It is certain that many technical, economic and political changes will occur between now and the time when reclamation begins; therefore, Ash Grove retains the right to negotiate changes in the plan prior to reclamation to incorporate new technology or to avoid unreasonable economic burden.

<u>REVEGETATION</u>

See Section 110.5 for revegetation description.

110.3 SURFACE FACILITIES TO REMAIN

No buildings currently exist at the site; therefore, none are likely to remain following reclamation. The pits will be recontoured and reseeded.

110.4 DELETERIOUS MATERIALS

No deleterious materials are used on-site and none will remain following mining, which would cause a problem to the environment.

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110.5 REVEGETATION PLANS

The rocky high desert terrain, on which the Nielson Sandstone facility is excavated, was sparsely covered with shrubs and grasses prior to mining (see Section 106.7). The primary land uses of the land prior to construction of the mining operation were rangeland and wildlife habitat. The following plan for revegetating those areas that have been disturbed by the mining operations at the Nielson Sandstone Mine will aid in returning the land use to an appropriate post-mining condition.

The area will be graded to approximate final contours, and then ripped to relieve compaction. Ripping will be completed to a maximum depth of 2 feet. Final ripping depths will be determined by the materials being ripped, to prevent incorporation of less desirable soil/rock into more productive materials.

Following ripping, stockpiled soil will be applied to the ripped surface and left in a roughened state. Hay and/or straw mulch or other suitable substitute with a high organic matter content, will be incorporated into the soil media at a rate of 2 tons per acre. This will be done to improve soil structure for aeration purposes, increase micropore space, and improve the water-holding capacity of the soil. Incorporation of this mulch will occur either by adding the mulch to the stockpiled soil in the truck prior to spreading and letting the spreading mix the mulch with the soil, by spreading mulch over the surface of the soil and mixing during the deep gouging activities, or a combination of these methods.

On slopes steeper than 2.5H: 1V, once the soil media are emplaced and either after or during incorporation of the initial mulch (depending on the method), the surface soil will be gouged across the slope to a depth of approximately 12 inches using the bucket of a trackhoe. The purpose of this gouging will be to reduce compaction of the upper soil and to increase water infiltration.

Care will be taken to avoid deep gouging into poorer quality materials underlying the soil materials. While it is recognized that the deep gouging process may extend below the thickness of the soils, the materials, which will underlie the soil layer, are neither acid- nor toxic-forming. Therefore, if these materials are exposed, they will not create revegetation concerns. Furthermore, wind and water transport of the adjacent soil will soon cover any exposed subsoils.

Table 110-1 shows a tentative seed mix that will be used and the rate at which each type of seed will be planted. All seeds will be incorporated with a small amount of mulch and applied by hydroseeding or broadcast seeding equipment, depending on slope and other considerations. All seeding will take place during the fall of the year. Seeded areas will not be irrigated to prevent shallow rooting and decreased drought tolerance.

Following seeding, the disturbed areas will be mulched with an organic mulching material. Application will be initiated at the top of the slope and working downhill. Organic mulch will be applied at the rate of 1 ton per acre and anchored with a tackifier.

No grazing is expected to affect the mine area prior to bond release. Wildlife and stray cattle may adversely impact revegetation efforts. If grazing adversely affects revegetation efforts, Ash Grove will develop plans with the land management agency to protect establishment of the vegetation.

Revegetation success will be evaluated based on Rule 111.13, of the DOGM General Rules and Regulations, which stipulates that revegetated lands must achieve a surface cover of at least 70% of the representative vegetative communities surrounding the mine and that the initiated vegetation must survive for three growing seasons without irrigation or soil amendments. To verify the prescribed level of cover and species diversity, these parameters will be measured using the point count method at the end of the third growing season. The cover from the vegetation studies conducted in the early summer of 1987 and 2002 will be used to determine the success standard for reclamation.

No erosion matting is proposed for the reclaimed surfaces.

APPENDIX 110-1

RESULTS OF AGRONOMIC ANALYSES OF SLAG

Soil Test Report

and

Fertilizer Recommendation

USU Analytical Labs
Utah State University
Logan, Utah 84322-4830
(435) 797-2217
(435) 797-2117 (FAX)
www.usual.usu.edu

Date Received: 4/7/2005
Date Completed: 4/12/2005

Name: RICHARD WHITE
Address: 7324 S UNION PARK AVE #100

MIDVALE UT 84047

Phone: 801-561-1555
County: SALT LAKE

Lab Number: 5010689
Identification: SLAG-1
Crop to be Grown: Reclamation

Grower's Comments:

Acres in Field:

Soil Test Results			Interpretations	Recommendations
Texture				
pH		12.6		
Salinity - ECe	dS/m	6.4		
Phosphorus - P	mg/kg			
Potassium - K	mg/kg			
Nitrate-Nitrogen - N	mg/kg			
Zinc - Zn	mg/kg			
Iron - Fe	mg/kg			
Copper - Cu	mg/kg			
Manganese - Mn	mg/kg			
Sulfate-Sulfur - S	mg/kg			
Organic Matter	%			
SAR				

Notes
PH AND SALT LEVELS INDICATE A SALINE-SODIC SOIL - WILL REQUIRE GYPSUM, DRAINAGE TO 6 FEET, LOTS OF IRRIGATION WATER AND LOTS OF TIME TO RECLAIM.

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For further assistance, please see your County Agent --

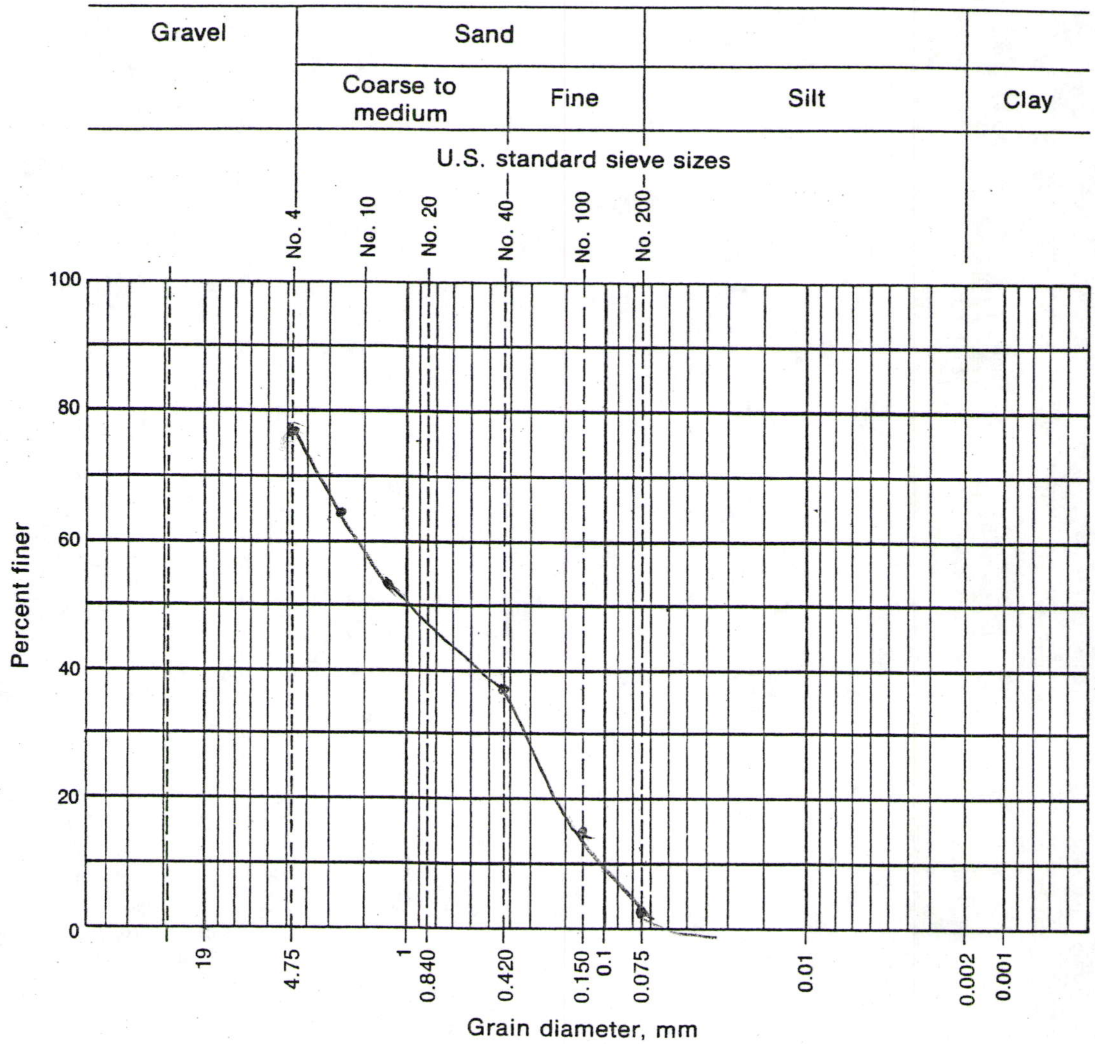
GRAIN SIZE DISTRIBUTION Data Sheet 6

Project UC 797-03 Job. No. ASH GROVE STEEL SLAG

Location of Project PROVO Boring No. ______ Sample No. ______

Description of Soil ______ Depth of Sample ______

Tested By. ______ Date of Testing ______



Visual soil description DARK GRAY (7.5 YR 4/1) GRAVELLY SAND LOOSE, DRY, ANGULAR PARTICLES, NO ORGANICS

Soil classification:

SW System ______

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EARTHFAX ENGINEERING, INC.
ENGINEERS / SCIENTISTS

PROJECT UC797-03 PAGE ____ OF ____
COMPUTED ____ DATE ____
ASH GROVE
CHECKED ____ DATE 4-7-05

STEEL SLAG TEXTURAL ANALYSIS

WEIGHT TOTAL = 998.4 + 451.3
= 1449.7 GRAMS

ZIPLOCK = 14.9 GRAMS

ON TOP OF SCREEN	#4	337.0	GRAMS
	#8	204.8	76.65 %
	#16	151.9	62.4 %
	#40	193.9	51.9 %
	#100	353.3	38.5 %
	#200	160.0	14 %
	PAN	42.5	
		1443.4	

#4	23.35 %
#8	14.19 %
#16	10.52 %
#40	13.43 %
#100	24.48 %
#200	11.08 %
PAN	2.94 %
	99.99 %

PERCENTAGE OF CLODDED DIRT IN THE LARGER SIZES IS RELATIVELY SMALL (< 5%). UNKNOWN IN SMALL SIZES

$\boxed{\text{SW}}$ WELL GRADED GRAVELLY SAND W/ LITTLE FINES

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APPENDIX 110-2

pH ADJUSTMENT OF SLAG IF RECLAIMED

APPENDIX 110-2

pH ADJUSTMENT OF SLAG IF RECLAIMED

Purpose

The current pH of the Geneva slag is 12.6 (see Appendix 110-1). If slag is left in place at the time of reclamation, the pH of slag within 4 feet of the surface should be reduced to prevent toxicity to plants used in revegetation.

Method

Elemental sulfur, when combined with moisture and oxygen in the soil, is converted to sulfuric acid, thereby dissolving the lime that creates the high pH in the slag. Therefore, for slag that remains in place at the time of reclamation, elemental sulfur will be added to any slag within 4 feet of the surface in a sufficient quantity to neutralize the pH in that upper material.

According to the University of Minnesota Extension Service (www.extension.umn.edu/distribution/horticulture/components/1731-05.html), elemental sulfur applied at a rate of 1.0 lb/yd^3 will lower the pH of sand by 1 unit. Although a pH of 7.5 to 8.5 is typical of soil in the region and is acceptable for the plants to be used in site reclamation, it is assumed for this analysis that sufficient sulfur will be added to lower the pH of the slag by 6 units (i.e., from 12.6 to 6.6). This additional sulfur will serve as a safety factor to ensure that an appropriate pH reduction occurs from the mitigation effort.

The worst-case scenario, as far as the quantity of slag is concerned, will occur if all of the slag remains in the pit at the time of reclamation, hence requiring pH mitigation in the greatest quantity of slag. The reclamation plan calls for 9 to 12 inches of subsoil and 6 inches of topsoil being spread over the area upon reclamation (see Section 110.2 of this plan). For the purpose of this evaluation, it is assumed that the pH of the upper 3 feet of slag will require modification, even though not all of that will be within 4 feet of the surface. Using the University of Minnesota recommendations, 1.0 pound of elemental sulfur will be required to reduce the pH of each square yard of slag to a depth of 3 feet by 1 pH unit. The slag will cover a maximum area of 573,000 ft^2 (63,700 yd^2). Thus, 63,700 pounds (32 tons) of sulfur will be required for each unit of pH reduction. To reduce the pH of the slag by 6 units, 192 tons of sulfur will be needed. For the sake of cost estimating, this quantity will be rounded up to 200 tons. The sulfur can be ripped and tilled into the upper 3 feet of slag.

SECTION 113 - SURETY

113.1 INTENT TO PROVIDE SURETY

Ash Grove has posted a surety to cover the required reclamation of the existing facilities. Once the plans for the expanded facilities are approved, Ash Grove will post a surety to cover the reclamation of the expanded facilities.

113.2 SURETY COORDINATION WITH OTHER AGENCIES

No other sureties cover this property.

113.3 SURETY AMOUNT

The amount of the surety is based on the costs presented in Tables 113-1 and 113-2. Table 113-1a and b presents the estimated costs for reclamation of Pit 1. Table 113-1a addresses the reclamation of the Pit1 highwalls and slope reclamation. Reclamation of the Pit1 floor and removal of the temporary storage areas is covered in Table 113-1b. Table 113-2 presents the estimated costs for reclamation of Pit 2.

As indicated in Section 110.2, it is assumed that the temporarily-stored material in Pit 1 will be removed prior to reclamation of the pit. However, if reclamation becomes necessary prior to removal of the stored material (i.e., with Pit 1 in its current configuration), the remaining material will be pushed against the highwall prior to reclamation. To assess the effect of the remaining material on the estimated reclamation cost and to ensure that the current reclamation bond is adequate, the reclamation cost was recalculated under the assumption that (under worst-case conditions) all of the slag noted in Figure 106-5 remained in the pit at the time of reclamation. According to Appendix 113-1, the estimated reclamation cost under this slag-in-place scenario is $528,000 as compared with $543,000 under the current plan (see Tables 113-1a and 113-1b). Hence, the surety amounts contained in Tables 113-1a, 113-1b, and 113-2 are sufficient under each potential reclamation scenario and the reclamation bond does not need to be changed.

113.4 SURETY TYPE

A bond has been posted to cover the required reclamation costs for the existing facilities. Once the plans for the expanded facilities are approved, Ash Grove will post a surety to cover the reclamation of the expanded facilities.

113.5 SURETY RELEASE

Following the completion of the required reclamation activities for each area of the mine property, Ash Grove will monitor the reclaimed areas. As these reclaimed areas meet the criteria for adequate reclamation, Ash Grove will petition the Division for release the surety for that portion of the operation.

113.6 SURETY ADJUSTMENTS AND REVISIONS

In accordance with existing DOGM Mining and Reclamation Regulations, the surety agreement will be reviewed every five years.

APPENDIX 113-1

ALTERNATE RECLAMATION BOND COST ESTIMATE ASSUMING ALL SLAG REMAINS IN PIT 1

NIELSON SANDSTONE QUARRY RECLAMATION BOND COST ESTIMATE

TABLE 113-1c

NIELSON SANDSTONE QUARRY RECLAMATION BOND COST ESTIMATE PIT 1 - SLAG STOCKPILE REMAINING

Item No.	Description	Quantity	Unit	Material Cost		Equipment Cost		Labor Cost		Project Cost	
				Per Unit	Total	Per Unit	Total	Per Unit	Total	Per Unit	Total
	DEMOLITION										
Note:	Unless otherwise noted, no salvage value was considered for any of this equipment.										
	(a) Means Heavy Construction Cost Data, 2000 increased by 9% to inflate to 2003 costs										
	(b) A Day is assumed to be 10 hours unless otherwise noted										
	(c) Dataquest Bluebook rates provided by Wayne Western of DOGM Coal Division										
	(d) The same unit costs are used for this calculation as for the previously approved bond estimation so that the costs can be compared.										
1	Asphalt Demolition										
	2 1/2 CY Hydraulic Excavator (bluebook 3Q02, pg10-8)										
	Asphalt removal - 26,367 SY x 6") = 4,394 CY	0.50	MO			9,205.00	4,602.50			9,205.00	4,602.50
	Excavator Operating Cost	100.00	HRS					80.90	8,090.00	80.90	8,090.00
	Hauling asphalt to off-site landfill in 16.5 CY trucks	267.00	RT			272.36	72,720.12			272.36	72,720.12
	(02320-200-1130 and 02320-200-4700)										
	Assume $1.50/mile beyond the first 20 miles										
	Tipping fees	267.00	LOAD			100.00	26,700.00			100.00	26,700.00
	Cost to dump at the Juab County Landfill for a truck and										
	trailer with a load over 5 tons										
2	Installation of Silt fence	550.00	LF	0.33	0.66			0.40	220.00	0.73	401.50
	(2370-550-1100)										
3	Removal of silt fence										
	Assume the same labor needed to remove as to install	550.00	LF					0.40	220.00	0.40	220.00
4	Water Truck for Reclamation Project (01590-400-7000)	1.50	MO			3,270.00	4,905.00	4,510.00	6,765.00	7,780.00	11,670.00
	assume half time driver and oper. cost at $205/day										
	Assume 22 operating days per month 8 hours per day										
	DEMOLITION TOTAL										**124,404.12**

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NIELSON SANDSTONE QUARRY RECLAMATION BOND COST ESTIMATE

TABLE 113-1c

NIELSON SANDSTONE QUARRY RECLAMATION BOND COST ESTIMATE PIT 1 - SLAG STOCKPILE REMAINING

Item No.	Description	Quantity	Unit	Material Cost		Equipment Cost		Labor Cost		Project Cost	
				Per Unit	Total	Per Unit	Total	Per Unit	Total	Per Unit	Total
	EXCAVATION - BACKFILL & GRADING										
	NIELSON SANDSTONE QUARRY PIT 1										
1	Drilling and Blasting (02315-340-0100)	10,221.00	CY	1.73	17,682.33	2.24	22,895.04	2.14	21,872.94	6.11	62,450.31
2	Cat D8R Dozer contouring without Ripper										
	Contouring of 6,176 CY or all topsoil pushed up slope	0.25	MONTH			13,620.00	3,405.00			13,620.00	3,405.00
	Dozer operating cost assuming a 150' haul	40.00	HRS					97.05	3,882.00	97.05	3,882.00
	(Dataquest bluebook 3Q02 pg 9- 43)										
3	Cat D8R Dozer contouring without Ripper										
	Contouring of 8,300 CY of topsoil in berms above highwalls	0.15	MONTH			13,620.00	2,043.00			13,620.00	2,043.00
	Dozer operating cost assuming a 150' haul	20.00	HRS					97.05	1,941.00	97.05	1,941.00
	(Dataquest bluebook 3Q02 pg 9- 43)										
4	Cat D8R Dozer contouring without Ripper										
	Contouring of remaining 11,524 CY of topsoil on flatter areas	0.20	MONTH			13,620.00	2,724.00			13,620.00	2,724.00
	Dozer operating cost assuming a 100' haul	24.00	HRS					97.05	2,329.20	97.05	2,329.20
	(Dataquest bluebook 3Q02 pg 9- 43)										
5	Cat D8R Dozer pushing slag, iron ore, and shale in stockpiles										
	Moving of 20,000 CY	0.40	MONTH			13,620.00	5,448.00			13,620.00	5,448.00
	Dozer operating cost assuming a 300' haul	80.00	HRS					97.05	7,764.00	97.05	7,764.00
	(Dataquest bluebook 3Q02 pg 9-43 and 49)										
6	Cat D8R Dozer ripping and pushing blasted material downhill										
	Ripping and pushing 10,221 CY of blasted material	0.15	MONTH			13,620.00	2,043.00			13,620.00	2,043.00
	Dozer operating cost assuming a 150' haul	20.00	HRS					97.05	1,941.00	97.05	1,941.00
	(Dataquest bluebook 3Q02 pg 9- 43)										

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NIELSON SANDSTONE QUARRY RECLAMATION BOND COST ESTIMATE

TABLE 113-1c

NIELSON SANDSTONE QUARRY RECLAMATION BOND COST ESTIMATE PIT 1 - SLAG STOCKPILE REMAINING

Item No.	Description	Quantity	Unit	Material Cost		Equipment Cost		Labor Cost		Project Cost	
				Per Unit	Total	Per Unit	Total	Per Unit	Total	Per Unit	Total
	EXCAVATION - BACKFILL & GRADING CONTINUED										
7	Hauling with 46 CY truck										
	Hauling of 17,700 CY of topsoil (2 trucks)	0.35	MONTH			27,250.00	9,537.50			27,250.00	9,537.50
	truck operating cost assuming an ave. 1400' round trip haul	65.00	HRS					180.70	11,745.50	180.70	11,745.50
	(Dataquest bluebook 2Q02 pg 20-1)										
8	Rough grading and loading with a 8 CY FEL										
	Loading of 17,700 CY of topsoil	0.35	MONTH			12,710.00	4,448.50			12,710.00	4,448.50
	FEL operating cost	65.00	HRS					87.55	5,690.75	87.55	5,690.75
	(Dataquest bluebook 3Q02 pg 9-27)										
9	Rough grading with a 4 CY Excavator of access roads										
	channels, etc.	0.50	MONTH			14,945.00	7,472.50			14,945.00	7,472.50
	Excavator operating cost	80.00	HRS					101.10	8,088.00	101.10	8,088.00
	(Dataquest bluebook 3Q02 pg 10-8)										
10	Reduce pH of slag within 4 ft of surface										
	Purchase sulfur - includes $42/ton delivery										
	(www.the-innovation-group.com/ChemProfiles/Sulfur.htm)	200.00	TON	100.00	20,000.00					100.00	20,000.00
	Dozer rental (01590-200-4360)	5.00	DAYS			1,524.00	7,620.00			1,524.00	7,620.00
	Implement rental (01590-200-1500)	5.00	DAYS			39.10	195.50			39.10	195.50
	Crew cost (B-11M)	5.00	DAYS					1,032.05	5,160.25	1,032.05	5,160.25
11	Test slag pH and chemistry										
	Labor	2.00	DAYS					400.00	800.00	400.00	800.00
	pH analyses	10.00	EA					10.00	100.00	10.00	100.00
	TCLP and SPLP analyses	4.00	EA					250.00	1,000.00	250.00	1,000.00
12	Re-application of sulfur (50% of initial)										
	Purchase sulfur (see above)	100.00	TON	100.00	10,000.00					100.00	10,000.00
	Dozer rental (01590-200-4360)	3.00	DAYS			1,524.00	4,572.00			1,524.00	4,572.00
	Implement rental (01590-200-1500)	3.00	DAYS			39.10	117.30			39.10	117.30
	Crew cost (B-11M)	3.00	DAYS					1,032.05	3,096.15	1,032.05	3,096.15
13	Surveying (01107-700-1100))	1.50	DAYS					545.00	0.00	545.00	817.50
14	Foreman - assume 1 month project (01310-700-0200)	1.50	MO					6,471.80	9,707.70	6,471.80	9,707.70
15	Pickup Truck -assume 1 month project (01590-400-7200)	1.50	MO			784.40	1,176.60			784.40	1,176.60

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NIELSON SANDSTONE QUARRY RECLAMATION BOND COST ESTIMATE

TABLE 113-1c

NIELSON SANDSTONE QUARRY RECLAMATION BOND COST ESTIMATE PIT 1 - SLAG STOCKPILE REMAINING

	EXCAVATION - BACKFILL & GRADING TOTAL										**207,316.26**

NIELSON SANDSTONE QUARRY RECLAMATION BOND COST ESTIMATE

TABLE 113-1c

NIELSON SANDSTONE QUARRY RECLAMATION BOND COST ESTIMATE PIT 1 - SLAG STOCKPILE REMAINING

Notes and Assumptions

Production and rental rates assume 5 10-hour work days per week and 22 work days per month. Rental time has been rounded up to the nearest fifth of a month.
The operating costs are based on the hours needed by the equipment to move the specified amount of material. Some double handling of the material is assumed.
Rental and operation rates for the scrappers, dozers, excavator, trucks, etc. were obtained from Wayne Western of the Utah Division of Oil Gas and Mining.
Assumes all 17,700 CY of topsoil in the stockpile are hauled to the pit by truck.
Ripper production using the Cat Handbook is estimated to be 1750 CY/hr assuming a seismic velocity of 3 ft/sec x 1000
Dozer production for a D8R dozer with U-blade and a 100' haul on a flat slope for spreading topsoil is 560 CY/hr based on the Caterpillar Performance Handbook.
Dozer production for a D8R dozer with a U-blade pushing 300' on relatively flat ground is assumed to be 270 CY/hr. (pushing out slag, iron ore, and shale stockpiles)
Dozer production for a D8R dozer with a U-blade and a 150' haul on a 2:1 slope for contouring is 170 CY/hr based on the Caterpiller Performance Handbook. (production used for 6,176 CY of topsoil pushed up slope)
Dozer production for a D8R dozer with U-blade and a 150' haul pushing topsoil down slope is 840 CY/hr based on the Caterpiller Performance Handbook. (production used to move 8300 CY of topsoil from berms)
Dozer production for a D8R dozer with a U-blade ripping and pushing downhill to a FEL is assumed to be 840CY/hr.
Excavator production for a 345BL excavator assuming a 75% efficiency is 450 CY/hr for loading trucks with topsoil from a stockpile and excavating channels
Cat 988F FEL production for loading trucks assuming 83% efficiency is 540 CY/hr.
The production for 46 CY trucks assumes 6 round trips per hour or 540 CY/hr/truck. The cost calculation assumes 2 trucks operating at the same time.
Surveying is not required full time. Assume that 1.5 days of surveying by a 2 man crew is needed.
This calculation assumes 1.5 months will be spent to reclaiming the pit and the access road.
A foreman and pickup truck for the entire project were accounted for in the backfill and grading section.
The water truck was accounted for in the demolition section.
THE HANDLING AND PLACEMENT OF TOPSOIL IS INCLUDED IN THE EXCAVATION - BACKFILL AND GRADING
Channel construction is included in backfill and grading costs since it only involves grading since there is no riprap or erosion control matting required

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NIELSON SANDSTONE QUARRY RECLAMATION BOND COST ESTIMATE

TABLE 113-1c

NIELSON SANDSTONE QUARRY RECLAMATION BOND COST ESTIMATE PIT 1 - SLAG STOCKPILE REMAINING

Item	Description	Quantity	Unit	Material Cost		Equipment Cost		Labor Cost		Project Cost	
No.				Per Unit	Total	Per Unit	Total	Per Unit	Total	Per Unit	Total
	REVEGETATION										
1	Seeding, hydro with mulch (35lb/acre)	573.00	MSF	18.03	10,331.19	8.56	4,904.88	8.05	4,612.65	34.64	19,848.72
	(02920-510-1700) pit and road										
2	Straw mulch - 2 tons/acre incorporated into the soil	573.00	MSF	20.17	11,557.41	0.92	527.16	0.71	406.83	21.80	12,491.40
	during gouging										
	(02910-500-0350) pit and road										
3	Deep gouging/mixing in mulch with excavator 2 CY (rental)	0.25	MONTH			9,205.00	2,301.25			9,205.00	2,301.25
	(Dataquest 3Q02 pg 10-8)										
	Operating costs (Dataquest 3Q02 pg 10-8)	40.00	HR			80.90	3,236.00			80.90	3,236.00
	REVEGETATION TOTAL										**37,877.37**
	AREA INCLUDES RESEEDING TOPSOIL STOCKPILE AREA										

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